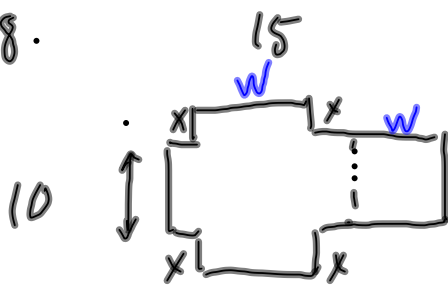


18.



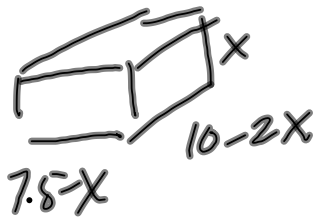
$$2x + 2w = 15$$

$$2w = 15 - 2x$$

$$w = \frac{15 - 2x}{2}$$

$$w = \frac{15}{2} - x$$

$$w = 7.5 - x$$



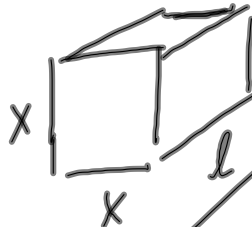
$$0 \leq x \leq 5$$

domain

$$v = \left(\frac{15 - 2x}{2}\right)(10 - 2x)x$$

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30.



$$\text{girth} = 4x$$

$$4x + l \leq 108$$

max volume

$$v = l \cdot x \cdot x$$

$$l = 108 - 4x$$

$$v = (108 - 4x)x^2$$

$$v = 108x^2 - 4x^3$$

$$v' = 216x - 12x^2 = 0$$

$$x(216 - 12x) = 0$$

$$x = 0$$

$$216 - 12x = 0$$

$$18 = \frac{216}{12} = x$$

$$v(18) = 108 \cdot 18^2 - 4 \cdot 18^3 = 11,664 \text{ m}^3$$

2nd der test

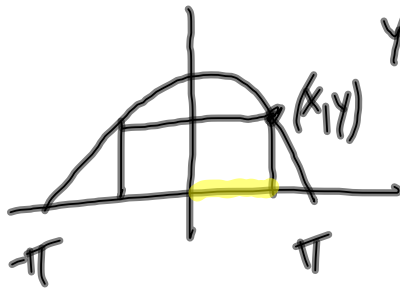
$$216 - 24x \big|_{x=18}$$

$$216 - 24(18) = -216$$

max

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21.



$$y = 4 \cos(.5x)$$

$$A = b \cdot h$$

$$b = 2x$$

$$h = 4 \cos(.5x)$$

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4.4 b more optimization!

hints: draw pic, label variables
 write equations that relate the
 variables. need equation for
 the thing you optimize.
 (in terms of variable)

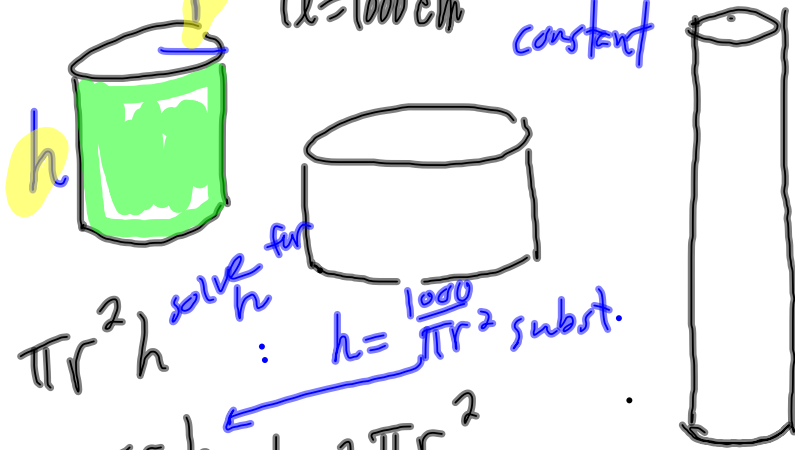
substitute
 c.p., e.p., 1st or 2nd der test
 ...

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Ex 4 design a can $V = 1 \text{ l min}$ **SA**

p221 $1 \text{ l} = 1000 \text{ cm}^3$ \uparrow constant \uparrow varies

variables h

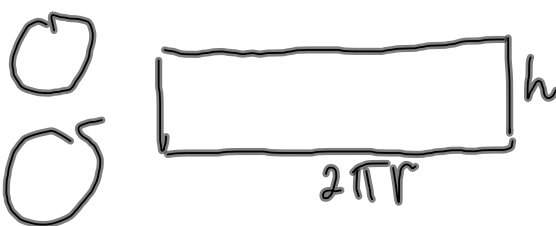


$1000 = V = \pi r^2 h$ solve for h : $h = \frac{1000}{\pi r^2}$ subst.

$SA = 2\pi r \cdot h + 2\pi r^2$

$SA = 2\pi r \cdot \frac{1000}{\pi r^2} + 2\pi r^2$

$SA = \frac{2000}{r} + 2\pi r^2$



Oct 23-10:04 AM